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UNIVERSITY OF TORONTO
FACULTY OF DENTISTRY

ANNUAL EXAMINATIONS

1971

HRA: 3399
15. 11. 71

RESTRICTED PAPERS - NOT AVAILABLE

I YEAR : GROSS ANATOMY

II YEAR : GENERAL PATHOLOGY

III YEAR : PREVENTIVE DENTISTRY
ORAL PATHOLOGY
PERIODONTICS
PHARMACOLOGY
ORAL SURGERY

IV YEAR : ORTHODONTICS
PAEDODONTICS
DENTAL RADIOLOGY

I DENTAL HYGIENE : PSYCHOLOGY

II DENTAL HYGIENE : PREVENTIVE DENTISTRY
PAEDODONTIA
PHYSIOLOGY
RADIOGRAPHY
SOCIOLOGY

BIOCHEMISTRY

First Year Dentistry
May 3, 1971

Marks

Answer the questions in the examination book.
Place your name on the examination book and the graph paper provided.

A. Answer three (3) of the following questions.

20 1. Discuss the formation of S-adenosyl methionine, and show the differences in its metabolic role with that of folic acid.

20 2. Discuss the relationship between transamination and oxidative deamination, showing the coenzymes and metabolic steps involved.

20 3. Compare the mechanisms and functions of the α glycerophosphate shuttle and the hexose monophosphate shunt.

20 4. Discuss the synthesis of fatty acids (saturated) in the cell, showing as much as possible of the intermediary metabolism.

20 5. Describe with the aid of diagrams, the role played by the different types of RNA in the process of protein synthesis.

B. Answer all of the following questions.

2 1. The biological value of a protein is determined by one of the following: (indicate the correct statement).

a) content of N
b) presence of P in the protein
c) taste and palatability of the protein
d) enzyme activity of the protein
e) content of essential amino acids

2 2. Phenylketonuria is characterized by one of the following: (indicate the correct statement).

a) inability to metabolize galactose
b) absence of γ globulin
c) hereditary lack of homogentisic acid oxidase
d) lack of amino acid decarboxylase
e) hereditary lack of phenylalanine hydroxylase

2 3. DNA synthesis appears to be controlled by one of the following: (indicate the correct statement).

a) transfer of methyl groups by vitamin B12
b) availability of ribonucleotide triphosphates
c) presence of RNA polymerase
d) presence of adenosine deaminase
e) presence of reduced folic acid

Marks

2 4. Purines are ingested in foods. Show the method by which they are eliminated. (indicate the correct statement).

a) as urea in man and the higher apes
b) as β amino isobutyric acid in humans
c) as uric acid by fish
d) as xanthine in man
e) as uric acid in the Hominidae.

2 5. One mole of high energy phosphate per mole of acetyl CoA metabolised in the mitochondrial citric acid cycle is generated by a substrate level mechanism independent of the electron transport chain. Which step is involved in this process?

a) Pyruvate to acetyl CoA
b) Succinyl CoA to succinate
c) α-Ketoglutarate to succinyl CoA
d) 1,3-diphosphoglycerate to 3-phosphoglycerate
e) None of these

10 6. Which of the following statements are true:

a) The level of citrate in the cell is thought to be an important regulator of glycolysis, high levels of citrate causing allosteric inhibition of phosphofructokinase.

b) The operation of the glycolytic pathway and the citric acid cycle is dependent on a supply of NAD^+.

c) The operation of the glycolytic pathway and the citric acid cycle is dependent on a supply of $NADH_2$.

d) Acetyl CoA in the mammalian cell is derived exclusively from pyruvic acid.

e) Mechanistically, fatty acid synthesis is the reverse of fatty acid oxidation.

10 7. In an enzyme experiment employing α amylase and its substrate starch, the following data were obtained. In the presence of maltose an inhibition was observed. Use the data (and graph paper) to determine the Km of α amylase (mg/ml) and to decide what type of inhibition is exhibited by maltose.

	α amylase reaction			and in presence of 25.4 mg. maltose	
S	$\frac{1}{S}$	v	$\frac{1}{v}$	v	$\frac{1}{v}$
11.52	.087	100	.010	68	.0147
5.76	.174	82	.012	57	.018
2.88	.348	58	.017	40	.025
1.44	.695	39	.026	26	.038

Substrate concentration S is mg./ml; v is a relative hydrolysis velocity

Marks

10 8. Describe briefly the following: phosphorolysis, lecithin, dextran, fluorapatite, β amylase.

UNIVERSITY OF TORONTO
FACULTY OF DENTISTRY

Annual Examination 1971

First Year
Histology

Please answer each section in a separate answer book.

Section A

It is recommended that 40 mins. be spent on this section.

Describe briefly with the aid of fully annotated diagrams, the histology of:

1. The parotid salivary gland.
2. Endochondral ossification.
3. The lip.
4. The periodontal ligament.

Section B

It is recommended that 80 mins. be spent on this section.

Write brief notes on the following.

1. taste bud.
2. the odontoblast.
3. the epithelial attachment.
4. cardiac muscle.
5. myelin.
6. lysosome.
7. mast cell.
8. keratin.
9. lamina dura
10. Hertwigs epithelial root sheath

11. Hunter-Schreger bands.
12. peritubular dentine.
13. enamel matrix.
14. secondary osteon.
15. Meckels' cartilage.
16. primary palate.

Section C

It is recommended that 60 mins. be spent on this section.

Compare and contrast the development, structural organization and functions of enamel and dentine.

UNIVERSITY OF TORONTO
FACULTY OF DENTISTRY

Annual Examinations, 1971

FIRST YEAR DENTISTRY

ORAL ANATOMY

MARKS

25 1. Draw the occlusal view, approximately 10X magnification of:

- a) $\underline{7}/$, and label the grooves only
- b) $\underline{e}/$, and label the ridges only
- c) $/\overline{5}$, and label the cusps only
- d) $/\overline{d}$, and label the surfaces only
- e) $\overline{8}/$, and label the fossae only

20 2. List and explain the critical events that occur in the development of the dentition from 6 years of age to 12 years of age.

30 3. You are conducting an examination of -

(i) a patient 15 years of age. The following is revealed:

- a) Class I dentition
- b) Maxillary, Mandibular alveolar dental retrusion
- c) Excessive overbite
- d) Excessive freeway space when the mandible is in the physiological rest position
- e) Exaggerated curve of occlusion as indicated by the curve of spee.
- f) Bennett angle 25°
- g) Incisal guidance related to excessive overbite
- h) Cuspal guidance related to patient's age
- i) Occlusion in functional centric
- j) The supporting cusp on $\underline{6}/$ is restored badly with centric stops missing.

With the aid of diagrams explain each of the above statements.

MARKS

10 3. ii) Draw the occlusal pathway that the mesial lingual cusp of /6 would follow in a functional left lateral excursion . What important consideration must be given to the restoration of the mandibular tooth to allow this to happen without interference?

Please answer Questions # 4 and 5 in a separate book.

10 4. Discuss the origin of the higher primates' reduced facial skeleton, manipulative forefoot and bipedal stance. In what ways might baboons be considered to have departed from their ancestors' adaptations? Do you consider that baboons represent greater or lesser adaptive responses to the same stimuli that produced man, and give your reasons.

5 5. Relate cusp and ridge patterns of molar teeth to the temporomandibular joint in herbivorous mammals. What is the function of the diastema?

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DENTISTRY I

Organic Chemistry Final Examination

Examiner: R. J. Mayfield

Time: 3 Hours

NOTE: (1) All questions are of equal value.

(2) Read the questions carefully before answering.

(3) Be accurate when drawing organic structures.

(4) Please set out as neatly as possible.

1. (a) By drawing the complete structural formula give one example of each of the following organic compounds. Use the proper or common nomenclature to name your example.

(i) an acid bromide

(ii) a tertiary amide

(iii) a mixed ether

(iv) a monosaccharide

(v) an α-amino carboxylic acid

(vi) a secondary alcohol

(vii) a dicarboxylic acid

(viii) a conjugated diene

(ix) a heterocyclic compound

(x) an α,β-unsaturated ketone

(b) State Markownikoff's Rule and show how it applies in the addition of hypochlorous acid to propene. Show an equation and rationalize Markownikoff's Rule in terms of the stabilities of possible intermediates in the reaction.

(c) Write equations for the reactions of 1,3-butadiene with each of the following reagents:

(i) bromine

(ii) hydrochloric acid

21

2. (a) Describe (briefly) how you would prepare THREE of the following compounds from benzene. Give all necessary reagents and illustrate your method by use of equations.

(i) benzoic acid

(ii) m-chloronitrobenzene

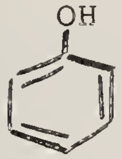
(iii) acetophenone

(iv) 2-phenyl-2-propanol

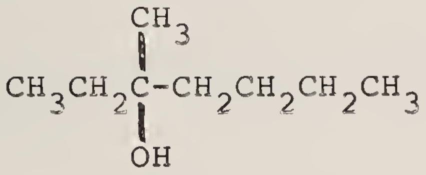
(v) ethylcyclohexane

(b) Explain why phenol undergoes electrophilic substitution far more readily than does benzene. Why is phenol ortho and para directing in its electrophilic substitution reactions? Support your answer with diagrams.

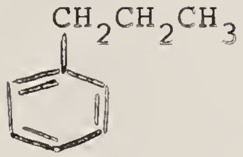
(c) Assume you have four unlabelled bottles each containing one of the following compounds. What are the simplest chemical tests that would allow you to label the bottles correctly.



$CH_3(CH_2)_4CH_2OH$



$$CH_3CH_2\overset{\overset{\displaystyle CH_3}{|}}{\underset{\underset{\displaystyle OH}{|}}{C}}-CH_2CH_2CH_2CH_3$$



3. (a) Define THREE of the following terms in as concise manner as possible. Illustrate your answers by the use of diagrams.

(i) enantiomers

(ii) diastereoisomers

Continued ... 3

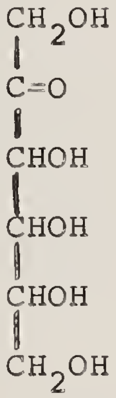
3. (a) (iii) racemic mixture

(iv) plane polarized light

(v) resolution

(b) The structure of the keto form of fructose is shown below. How many asymmetric carbon atoms, optically active isomers, and pairs of enantiomers has the keto form of fructose? Draw the Fischer projection for any one pair of enantiomers of fructose.

keto form of fructose



$$\begin{array}{l} CH_2OH \\ | \\ C{=}O \\ | \\ CHOH \\ | \\ CHOH \\ | \\ CHOH \\ | \\ CH_2OH \end{array}$$

(c) α-D-Glucopyranose and β-D-glucopyranose are the two cyclic hemiacetal forms of glucose. The specific rotation of the α-form is +113° and that of the β-form is +19°. If either the α- or β-form is dissolved in water the specific rotation slowly alters to a constant value of +52°. Explain why this occurs. What is this process called?

4. (a) Give the underlying reasons for TWO of the following statements. Support your answers with diagrams and/or equations.

(i) Formic acid is more acidic than acetic acid.

(ii) Ethanol and dimethyl ether are structural isomers yet the boiling point of dimethyl ether is -24° whereas that of ethanol is 78°.

(iii) The reaction of hydrobromic acid with t-butyl alcohol is an S_N1 reaction.

(iv) The Claisen condensation is useful for the synthesis of β-ketoesters.

(b) Indicate, by use of equations only, how the two following conversions could be carried out. Show all necessary reagents.

Continued ... 4

25

4. (b) (i) Benzoic acid to methyl benzoate.

(ii) Methylamine to N,N-dimethylacetamide.

(c) Which of the following compounds would give a positive iodoform test:

methanol, acetophenone, isopropanol, diethyl ketone, acetone, ethanol, benzaldehyde, acetaldehyde.

Show an equation for ONE of the compounds that gives a positive test.

5. (a) Give brief answers to the following questions.

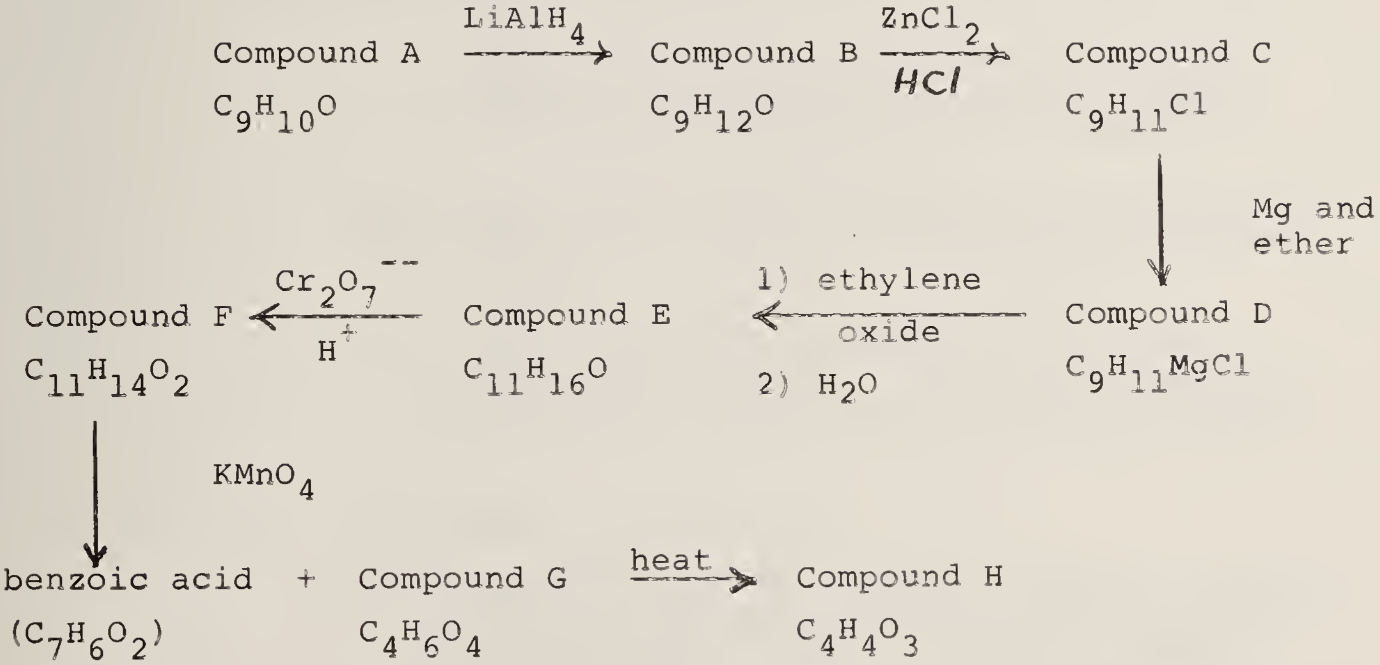
(i) What is the structural difference between a fat or oil and a soap?

(ii) What is the structural difference between a fat and oil?

(iii) How can a fat or oil be converted to a soap?

(iv) How can an oil be converted to a fat?

(b) The following series of reactions are carried out starting with Compound A. Molecular formulas of all compounds are shown.



UNIVERSITY OF TORONTO
Faculty of Dentistry

Annual Examinations 1971

SECOND YEAR

BACTERIOLOGY

MARKS

1. Answer two of the following:

10 a) Describe in a list form the chemical, physical and physiological differences between 5 classes of immunoglobulins.

b) What are the differences in the primary and secondary response of antibody synthesis upon injection of an antigen in an experimental animal?

c) What is the involvement of complement factors in the "Arthus reaction" and describe this reaction?

d) Give a time schedule for active immunization and testing of children, briefly describing the substances used.

10 2. Answer one of the following:

a) Describe the various hypersensitivity reactions which have been observed following an injection of penicillin. How would these be treated?

b) What are the mechanisms involved in the pathogenesis of hay fever? Describe the diagnostic tests and treatment.

c) What are the mechanisms involved in the "post streptococcal" diseases? What are the possible late sequella? What are the preventive measures?

10 3 Answer one of the following:

a) What are the clinical symptoms of the most common streptococcal infections of infants? What would be the laboratory tests to confirm the diagnosis?

b) What are the clinical symptoms of upper respiratory infections of streptococci? What would be the laboratory tests?

c) Describe the pathogenesis, clinical symptoms and epidemiology of scarlet fever.

10 4. Answer one of the following:

a) What is the contribution of streptococci in the formation of a dental plaque?

b) What is the contribution of bacteria in the acid production in a dental plaque?

10 5. Answer one of the following:

a) Describe the pathogenesis, clinical symptoms and diagnostic laboratory tests of bacterial urinary tract infections.

b) What are the differences in the clinical symptoms, laboratory test and treatment of bacterial and viral pneumonias.

10 6. Answer one of the following:

a) What are the primary sites of tuberculosis and describe the possible spread of the infection from these sites, including the major clinical symptoms.

b) Give a classification of Mycobacteria based on type, pathogenicity, laboratory test, and epidemiological occurrence.

c) Describe the epidemiology of tuberculosis and what preventive measures and testing methods are advocated by World Health Organization.

10 7. Answer one of the following:

a) What are the oral manifestations of syphilis and indicate the diagnostic procedures.

b) What are the oral manifestations of candida infections and indicate the diagnostic procedures.

c) What are the oral manifestations of herpes infection and indicate the diagnostic procedures.

d) What are the oral manifestations of smallpox and indicate the diagnostic procedures.

10 8. Give a short account of the epidemiology, testing methods and preventive measures of ONE of the following:

a) Influenza

b) Diphtheria

c) Typhoid fevers

d) Staphylococcal infections

20 9. Write a short note on four of the following:

a) Leptospiral diseases

b) Oral filamentous organisms

c) Erythroblastosis faetalis

d) Croup

e) Tinea capitus

f) Yaws

g) Apthous ulcers

h) Histoplasmosis

i) Viral encephalomyelitis

j) Rubella

k) Mumps

l) Zoster

m) Moluscum contagiosum

n) Action of semi-synthetic penicillins

UNIVERSITY OF TORONTO

Faculty of Dentistry

Second Year

FINAL EXAMINATION IN PHYSIOLOGY

Tuesday, April 27th, 1971 - 1:30 p.m. - 4:30 p.m.

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED TO DO SO.

INSTRUCTIONS:

1. Answers are to be given on the printed-form page. Enter your name and student number in the coding-block and sign.
2. The answer to each question is to be selected from the alternatives, lettered A to E, according to the instructions.
3. The selected answer is entered on the Answer Page, by marking across the letter selected, using a soft lead pencil to fill in completely the marking zone.
4. If you wish to change a selection, the mark not desired can be erased. Make sure, however, that the incorrect mark is erased completely.
5. The questions are of equal value. An appropriate fractional mark will be deducted for incorrect answers but NOT for omission of answers.

In answering questions 1 to 100, select the correct or most appropriate of the alternatives lettered A to E.

1. The volume of the interstitial (intercellular) fluid in the body of a normal person is:

    X A. greater than that of the intracellular fluid.
    B. equal to the sum of the volumes of the blood plasma and of lymphatic fluid.
    C. equal to that of total body water minus intracellular fluid.
    D. equal to that of total body water minus extracellular fluid.
    E. none of A to D are appropriate.

2. The substance inulin may be used for measurement of the volume of the following compartment of the body in individuals:

    X A. plasma of blood.
    B. lymph.
    C. interstitial fluid.
    D. extracellular fluid.
    E. intracellular fluid.

3. The intracellular fluid as compared to the extracellular fluid is relatively high in:

    A. chloride and phosphates.
    B. potassium and proteins.
    C. sodium and bicarbonate.
    D. chloride and protein.
    E. none of A to D are appropriate.

4. Interstitial fluid of muscle, as compared to blood plasma is relatively:

    A. low in sodium concentration.
    B. low in colloid osmotic pressure.
    C. high in hydrostatic pressure.
    D. high in total (effective) osmotic pressure.
    E. none of A to D are appropriate.

5. The total (effective) osmotic pressure of the blood plasma is due to substances in solution. Which of the following components, or groups of components, contributes most to the total osmotic pressure of the plasma of a normal person?

   A. proteins.
   B. potassium ion plus bicarbonate ion.
   [✓ C.] sodium ion plus chloride ion.
   D. glucose plus urea, plus creatinine, plus the other organic crystalloids.
   E. proteins, plus the substances given in D.

6. In blood plasma, the ratio HCO_3^-/H_2CO_3 has, normally, the value of 20/1. The value of the ratio is decreased in:

   [✓ A.] untreated diabetes mellitus.
   B. overbreathing.
   [✓ C.] underventilation or breath-holding.
   D. ingestion of a substantial dose of sodium bicarbonate.
   E. both A and C are correct.

7. Under ordinary circumstances in the normal subject, regulation of the volume and composition of the extracellular fluid is achieved chiefly by alterations in the fluids of:

   A. expired air.
   B. transpiration from the skin.
   C. sweat.
   D. faeces.
   [✓ E.] urine.

8. In the transfer of fluid and solutes across the capillary membrane of normal tissues:

    A. the chief factors are permeability of the membrane and active transport of sodium ion.
    B. the chief forces are due to electrolyte concentration difference and hydrostatic pressure difference between plasma and interstitial fluid.
    = C. fluid passes from plasma to interstitial fluid at the arterial end of the capillary, and in the reverse direction at the venous end, due chiefly to change in total osmotic pressure difference.
    D. the reversal of fluid flow, stated in part C above, is due chiefly to change in colloid osmotic pressure of plasma in transit through the capillary.
    E. the chief reason for the reversal of fluid flow, stated in part C above, is the decrease in hydrostatic pressure of blood as it flows through the capillary.

9. Functional roles of the lymphatic system include all of the following, except:

    A. ✓ to provide a means of drainage of fluid from the tissue spaces.
    B. ✓ to prevent the accumulation of protein in the tissue spaces.
    C. ✓ to maintain conditions that permit the two-way interchange of fluid between blood plasma and tissue fluid.
    [✓ D.] to be the chief route for the carriage of absorbed glucose and amino acids from the intestine, via the thoracic duct, to the venous blood stream.
    E. to provide the chief route of transfer of lipids absorbed from the intestine to the blood.

10. The ammonia excreted in urine is produced chiefly in the:

    A. liver.
    – B. kidney.
    C. muscle.
    D. alimentary tract tissue.
    E. lumen of the alimentary tract, by digestive breakdown of amino acids derived from the foodstuffs.

#11

11. The amount of ammonia excreted in the urine is decreased by the condition of:

    A. insulin deficiency.
    B. underventilation of the lungs.
    C. ingestion of appreciable amounts of an acidic substance, such as acid phosphate (NaH_2PO_4).
    D. fasting, with sufficient intake of water.
    E. ingestion of appreciable amounts of an alkaline substance, such as alkaline phosphate (Na_2HPO_4).

12. The cell membrane (plasma membrane) is most permeable to:

    A. sodium ion.
    B. proteins.
    C. organic phosphates.
    [✓ D.] chloride ion.
    E. potassium ion.

13. Consider the passage of solutes across the cell membrane (plasma membrane) in the direction from the extracellular fluid to the intracellular fluid. Which of the following statements is appropriate?

    A. the electrical gradient opposes the movement of sodium ion.
    B. the electrical gradient opposes the movement of potassium ion.
    C. the concentration gradient opposes the movement of sodium ion.
    D. the concentration gradient favours the movement of potassium ion.
    [✓ E.] none of A to D are appropriate.

14. The membrane potential (an electromotive force exerted across the membrane) in nerve fibres is:

    A. not present in nerve fibres that are at rest.
    B. momentarily increased in nerve fibres during the early phase of excitation.
    C. has the polarity of positive charge on the inside, and negative charge on the outside.
    [✓ D.] none of A to D are appropriate.

15. On excitation and production of an action potential in nerve fibres, the first event observed is:

    A. increase in membrane potential.
    B. increase in permeability of the membrane to potassium ion.
    C. increase in the permeability of the membrane to sodium ion.
    D. increase in the activity of the sodium pump process.
    E. none of A to D are appropriate.

16. The conditions that tend to cause accumulation of fluid in the tissue spaces of the lower leg are as follows, except for:

    A. walking (as compared to standing still for some time).
    B. high environmental temperature, with rise in skin temperature (as compared to moderate temperature).
    C. the standing position (as compared to the recumbent).
    D. reduction in albumin concentration in plasma.
    E. high venous blood pressure.

17. Which of the following factors is most important, in the normal subject under ordinary conditions, in causing arousal of the sensation of thirst and the drive for ingestion of water?

    A. reduction in blood volume.
    B. reduction in arterial blood pressure.
    C. reduction in salivation, causing dryness of the mouth.
    D. increase in total (effective) osmotic pressure of blood plasma.
    E. Decrease in colloid osmotic pressure of plasma.

18. A normally hydrated subject participates in a test by drinking a large volume of water in a short time. Which of the following endocrine glands would be expected to be most involved in restoring body fluids to the initial state?

    A. the posterior pituitary gland.
    B. the anterior pituitary gland.
    C. the adrenal cortex.
    D. the adrenal medulla.
    E. the juxtaglomerular cells of the kidney.

19. The pressure of blood in the jugular vein in the recumbent subject, lying on the back, is:

   A. increased by raising the legs and feet above the level of the trunk.
   B. increased transiently by making a deep inspiration.
   C. increased by raising the head and shoulders by means of a pillow.
   D. increased transiently by rising up, to the standing posture.

20. In a subject at rest, the arterial mean blood pressure was 100 mm Hg., and the cardiac output was 5.00 litres per minute. In the same subject during exercise, the corresponding values were 160 mm Hg., and 20 litres per minute. The total peripheral resistance to blood flow was therefore:

   A. increased by exercise.
   B. decreased by exercise.
   C. unchanged by exercise.

21. In the subject described in the previous question, the ratio for peripheral resistance at rest in exercise was, therefore, closest to:

   A. 0.2
   B. 0.4
   C. 1.0
   D. 2.5
   E. 4.0

22. In the pulmonary circuit, as compared to the systemic:

   A. the volume of blood contained is lower.
   B. resistance to blood flow is lower.
   C. arterial blood pressure is lower.
   D. arterioles are fewer.
   E. all of A to D are correct.

23. Of the types of vessels through which the blood flows in the system circuit, the velocity of flow is least in the:

   A. small arteries.
   B. arterioles.
   C. capillaries.
   D. venules.
   E. veins.

24. Of the types of vessels through which blood flows in the systemic circuit, the pressure of blood is least in the:

    A. small arteries.
    B. arterioles.
    C. capillaries.
    D. venules.
    E. veins.

25. The factor of chief importance in modifying the rate of flow of blood through the cerebral blood vessels is:

    A. cardiac output.
    B. arterial blood pressure.
    C. oxygen tension in arterial blood.
    D. carbon dioxide tension in arterial blood.
    E. all of A to D are equally involved in regulation of cerebral blood flow.

26. The carotid sinus on one side was perfused by an extracorporeal system in an anaesthetized animal. The pressure of the perfusion fluid was increased from 100 to 140 mm Hg. The result expected from this change is that the:

    A. arterial blood pressure would increase.
    B. arterial blood pressure would not change.
    C. the heart rate would increase.
    D. the heart rate would not change.
    E. none of A to D are appropriate.

27. It can be expected that, in the isolated, perfused heart:

    A. raising the temperature of the perfusion fluid, from the temperature of 25°C to that of 28°C will increase heart rate.
    B. addition of adrenaline to the perfusion fluid will increase heart rate.
    C. addition of acetylcholine to the perfusion fluid will decrease heart rate.
    D. all of A to D are appropriate.

28. In a patient in whom the heart muscle (myocardium) has been damaged (as by thrombosis of parts of the coronary blood vessels) one would expect to find:

    A. increased stroke volume, and decreased heart rate.
    B. increased stroke volume, and increased heart rate.
    C. decreased stroke volume, and increased heart rate.
    D. decreased stroke volume, and decreased heart rate.
    E. decreased stroke volume, and normal heart rate.

29. In a cycle of the normal heart, the closure of the atrio-ventricular valves is effected by:

    A. atrial contraction.
    B. contraction of papillary muscles.
    C. ventricular relaxation.
    D. momentary backward movement of blood in the ventricle.
    E. increase in pressure of blood in the aorta.

30. The QRS complex of the electrocardiogram:

    A. immediately precedes ventricular contraction.
    B. immediately precedes atrial contraction.
    C. is associated with ventricular relaxation.
    D. is coincident with atrial relaxation.
    E. is coincident with opening of the aortic (semilunar) valves.

31. Select the most appropriate of the statements lettered A to E.

    A. Blood lacking in Hageman Factor will not clot after being withdrawn from a vein and placed in a test-tube.
    B. Blood placed in a test-tube whose surface has been siliconed will clot more rapidly than blood (from the same source) placed in an ordinary test-tube.
    C. Blood platelet level is reduced by the administration of dicoumarol.
    D. The only means of inducing clotting of citrated blood is by the addition of calcium in ionized form.
    E. A "wettable" surface increases the rate of clotting of blood.

32. Select the most appropriate of the statements lettered A to E.

A. Clot retraction is dependent on the presence of platelets in plasma.
B. Clot retraction is dependent on fibrinogen concentration.
D. Dicoumarol prevents clot retraction.
E. Clot retraction is not important for haemostasis.

33. Select the most important completion.

An important function of platelets is to:

A. release thromboplastin activity.
B. release fibrinogen.
C. activate prothrombin.
D. release a phospholipid that promotes coagulation of blood.
E. activate angiotensinogen.

34. Select the most appropriate of the statements lettered A to E.

A. Women never suffer from haemophilia.
B. In the blood of haemophiliacs, it is usually found that the prothrombin time is in the normal range.
C. Haemophilia is associated with decrease in blood platelets.
D. In haemophilia, the "bleeding time" (time required for arrest of bleeding from a small superficial cut in the skin) is prolonged.
E. Persons with haemophilia develop thromboplastin activity in the blood at the same rate as do normal individuals.

35. In the normal subject at rest, when the respiratory system is momentarily at the position of end-normal expiration, the:

A. intrapleural (intrathoracic) pressure is negative.
B. pulmonic (intrapulmonary) air pressure is above atmospheric pressure.
C. resistance to air flow from lungs reduces pulmonic air pressure below atmospheric pressure.
D. elastic recoil force of the thoracic wall tends to draw the wall inwards, further reducing the volume of the thorax.
E. none of A to D are appropriate.

36. During inspiration in the resting subject, the:

A. pulmonic (intrapulmonary) air pressure is above atmospheric air pressure.
B. intrapleural (intrathoracic) pressure is equal to atmospheric air pressure.
C. air-way resistance to air flow tends to raise intrapleural pressure towards atmospheric pressure.
D. none of A,B or C is appropriate.

37. During expiration (exhalation) in the resting subject, the:

A. alveolar air pressure falls below atmospheric air pressure.
B. internal intercostal muscles contract actively.
C. intrapleural (intrathoracic) air pressure returns to equal atmospheric air pressure.
D. rate of return of venous blood in the great central veins of the thorax is increased above the rate in inspiration.
E. none of A to D are appropriate.

38. Surface tension at the interface of the alveolar air and the surface of the alveoli in the normal lung:

A. decreases the recoil force of the lung.
B. remains constant at varying degrees of expansion of the alveoli.
C. increases as the radius of the alveolus decreases.
D. decreases as the radius of the alveolus decreases.

39. In Toronto, in normal adult subjects at rest, the values for the partial pressure of oxygen (P_{O_2}) in arterial blood and in alveolar air are closest to:

	Arterial Blood P_{O_2} mm.Hg.	Alveolar Air P_{O_2} mm.Hg.
A.	40	150
B.	60	140
C.	70	120
D.	90	100
E.	120	140

55

40. In an adult subject at rest, the following values were found:

Tidal volume = 500 ml.
Frequency (rate) of breathing = 14 breaths per minute
Dead space volume = 150 ml.

The rate of alveolar ventilation (ml. per minute) was therefore closest to:

A. 2100
B. 4900
C. 5350
D. 7000
E. 7500

41. In venous, as compared to arterial blood, the following are found, except that the:

A. haematocrit reading (volume per cent of red blood corpuscles) is increased.
B. bicarbonate concentration of plasma is increased.
C. hydrogen ion concentration of plasma is increased.
D. oxygen-binding capacity of haemoglobin is decreased.
E. base-binding capacity of haemoglobin is increased.

42. In an experiment on a normal subject at rest, the tidal volume and the frequency of breathing were measured, to give the rate of ventilation (minute ventilation rate). The subject was then instructed to maintain this rate of ventilation, while reducing the tidal volume to one-half and doubling the frequency of breathing. This manoeuver can be expected to result in:

A. no change in the partial pressure of carbon dioxide in alveolar air.
B. increase in the partial pressure of carbon dioxide in arterial blood.
C. increase in the pH of arterial blood.
D. no change in alveolar ventilation rate.
E. none of A to D are appropriate.

43. A subject hyperventilated (rate and depth of breathing increased) voluntarily for several minutes. Which one of the following changes would NOT be expected to occur during this period of hyperventilation?

A. Decrease in the partial pressure of carbon dioxide in alveolar air.
B. Decrease in the hydrogen ion concentration in arterial blood.
C. Increase in the ratio: HCO_3^-/H_2CO_3 in plasma.
D. Marked increase in the degree of saturation of haemoglobin with oxygen in arterial blood.
E. Increased affinity of combination between haemoglobin and oxygen, (that is, increased oxygen-binding capacity of haemoglobin).

44. During the hyperventilation in the subject described in Question No. 43 above, which one of the following changes would be expected to occur?

A. Vasodilatation of cutaneous blood vessels.
B. Vasoconstriction of cerebral blood vessels, with decreased blood supply to the brain.
C. Neuromuscular reflex activity depressed.
D. Increased concentration of ionized calcium in plasma.

45. In an anaesthetized animal, transsection of the brain stem and spinal cord at the level of calamus scriptorius (at the lower border of the medulla oblongata) can be expected to cause in the following several minutes:

A. cessation of breathing activity.
B. increased depth and frequency of breathing.
C. little or no change in breathing.
D. continued activity in intercostal muscles.
E. continued activity of diaphragmatic muscle in breathing.

46. Absorption of calcium by the intestine can best be promoted by which one of the following?

A. Calcitonin administration.
B. Aldosterone administration.
C. Increased intake of fats.
D. Increased intake of phosphate.
E. Exposure to sunlight.

47. In the infant with rickets, it is usually found that:

A. the urinary excretion of calcium is above normal.
B. the calcium x phosphate product in serum is normal.
C. in bone, the epiphyseal cartilage and organic matrix are atrophic.
D. bone is deficient in calcium and phosphorus.
E. both C and D are correct.

48. Following parathyroidectomy it is usually found that:

A. calcium level in plasma is increased.
B. phosphate level in plasma is decreased.
C. urinary excretion of calcium is increased.
D. urinary excretion of phosphate is increased.
E. neuromuscular excitability is increased.

49. The administration of parathyroid hormone in effective doses for about 3 days in animals can be expected to cause:

A. decrease in calcium level in plasma.
B. rise in phosphate level in plasma.
C. increase in the urinary excretion of phosphate..
D. increase in the mineral of bone.
E. decrease in the urinary excretion of calcium.

50. Dietary iodide is required for the formation of:

A. propylthiouracil.
B. insulin.
C. thyroglobulin.
D. thyroid-stimulating hormone.
E. calcitonin.

51. In an adult patient, the following were found on clinical examination and testing. Indication of fluid accumulation or adiposity in tissues of the face (moon-face), neck and abdomen. Complexion appeared florid. Reddish striae on skin of abdomen. Legs and arms appeared rather thin, indicating loss of muscle tissue. Spontaneous fractures of bone (vertebrae and ribs) and loosening of teeth were reported. Marked loss of bone mineral was indicated by X-ray examination. Blood pressure high. Blood glucose level slightly above normal.
These signs are most consistent with possible existence of:

A. diabetes mellitus.
B. adrenal cortical insufficiency.
C. adrenal cortical overactivity.
D. overactivity of the parathyroid glands.
E. overactivity of the adrenal medulla.

52. In untreated diabetes mellitus, alterations from the normal can be expected.
Indicate that which is appropriate.

A. Blood plasma glucose increased, free fatty acids decreased, and ketone bodies increased.
B. Blood plasma free fatty acids increased, ketone bodies increased and bicarbonate decreased.
C. Blood plasma glucose increased and bicarbonate increased.
D. Urinary excretion of water decreased, and of glucose and urea increased.
E. None of A to D are appropriate.

53. Glucagon is:

A. a polymer of carbohydrates, including glucosamine, found in connective tissue matrix.
B. a peptide hormone produced by the alpha cells of the pancreatic islets.
C. an anticoagulant factor, found in high concentration in blood platelets.
D. a gluco-steroid hormone of the adrenal cortex.
E. None of A to D is correct.

54. An effect of injection of adrenocorticotrophic hormone (ACTH) in hypophysectomized rats is:

A. decreased lipolysis in adipose tissue.
B. rapid increase in the concentration of ascorbic acid in the adrenal gland.
why
C. rapid increase in the cholesterol content of the adrenal gland.
D. reduction in blood eosinophil count.
E. None of A to D are appropriate.

55. The chief site of release of corticotrophin releasing factor (CRF) is:

A. the supraoptic nucleus of the hypothalamus.
B. the paraventricular nucleus of the hypothalamus.
C. the median eminence of the hypothalamus.
D. the posterior pituitary gland.
E. the anterior pituitary gland.

56. In which of the following conditions or states may the administration of adrenaline or adrenaline-like substances be of benefit?

A. In the patient who has episodes of cardiac arrythmia.
B. In the patient who suffers from asthma.
C. In the patient with fragility of blood vessel walls, and suspected aneurysm.
D. In the patient with hypertension.
E. In the patient with deficient gastric secretion.

57. Increased sensitivity to insulin (moderate doses causing marked hypoglycaemia) is found in:

A. adrenalectomy.
B. hypophysectomy.
C. administration of growth hormone to animals.
D. Both A and B are correct.
E. A,B and C are all correct.

58. Administration of cortisol (hydrocortisone) in effective doses for 3-4 days in man can be expected to cause:

    - A. decrease in free amino acid concentration in plasma.
    - B. decrease in urea concentration in plasma.
    - C. increase in glycogen content of skeletal muscle.
    - D. increase in glucose uptake by muscle and adipose tissue.
    - E. decrease in glucose production from amino acids in the liver.

59. Lipolysis in adipose tissue is stimulated by:

    - A. administration of glucose, with rise in blood glucose concentration.
    - B. administration of insulin in moderate dosage.
    - C. administration of adrenocorticotrophic hormone.
    - D. ingestion of an ordinary meal.
    - E. None of A to D are appropriate.

60. The administration of aldosterone in effective doses for about 3 days can be expected to result in:

    - A. decrease in the volume of the extracellular fluid.
    - B. increase in the concentration of potassium in blood plasma.
    - C. decrease in the concentration of sodium in blood plasma.
    - D. increased retention of electrolytes in the body.
    - E. decreased urinary excretion of potassium.

61. Administration of effective doses of glucagon causes, in the rat:

    - A. rise in blood glucose.
    - B. glycogenolysis in the liver.
    - C. increased secretion of insulin.
    - D. All of A to D are correct.

62. A patient coming for dental treatment exhibits the following signs. Skin warm, but dry, with evidence of dehydration. The patient is thirsty and drinks three glasses of water. Pulse rapid, but weak. Breathing is rapid and deep, indicating "air-hunger". Breath has an "acetone-like" odour. Bacterial infection in oral mucosa and skin is evident. Lassitude. Speech slow and vague.

These signs are most consistent with the possible existence of:

A. diabetes insipidus.
B. Addison's disease.
C. alcoholic intoxication.
D. hypoglycaemia.
E. diabetes mellitus.

63. Pancreatectomy causes marked changes in metabolism of lipids in the body. Indicate the most appropriate statement (A to E).

A. The rate of lipolysis in adipose tissue is decreased.
B. The rate of production of acetoacetate by the liver is increased.
C. The rate of oxidation of lipid in the body is decreased.
D. The amount of lipid in the liver is decreased.
E. None of A to D are appropriate.

64. The serum factor activity in plasma, induced by treatment of the hypophysectomized rat with growth hormone, has been shown (by Daughaday and his colleagues) to have the effect of:

A. enhancing the rate of synthesis of adrenaline.
B. enhancing the rate of production of glucose by the liver.
C. enhancing the rate of incorporation of sulphate into mucopolysaccharides of cartilage.
D. enhancing the rate of production of urea.
E. All of A to D are correct.

65. Stimulation of secretion of growth hormone, signalized by a rise in the concentration of growth hormone in blood plasma, is produced by several means. Indicate which of the means listed below does NOT produce the effect.

    A. Administration of glucose, with rise in plasma glucose.
    B. Administration of insulin, with fall in plasma glucose.
    C. Alarming stimulus, such as a loud noise, or pain.
    D. Administration of amino acids.

66. Administration of growth hormone in effective doses for about 5 days in fed dogs can be expected to cause changes listed below. Which one of these is NOT appropriate?

    A. Increase in free fatty acids of plasma.
    B. Increase in glucose of plasma.
    C. Increase in fibrinogen of plasma.
    D. Decrease in insulin of plasma.
    E. Increase in esterified fatty acids of plasma.

67. Effects produced by injection of adrenaline in effective dosage are listed in the following. Indicate the exception that is NOT appropriate.

    A. Glycolysis in muscle.
    B. Increase in blood lactate.
    C. Decrease in liver glycogen content.
    D. Rise in blood glucose.
    E. Fall in blood free fatty acids.

68. In about 3 days after adrenalectomy in the dog, which of the following alterations is NOT expected to occur?

    A. Blood urea concentration above the normal range.
    B. Blood glucose concentration below the normal range.
    C. Arterial blood pressure above normal.
    D. Blood plasma volume low.
    E. Resistance to cold exposure reduced.

69. An event in normal swallowing which may or may not occur is:

    A. stripping action of pharyngeal constrictors.
    B. relaxation of hypopharyngeal sphincter.
    C. contact between teeth of the upper and lower jaws.
    D. elevation of the larynx.
    E. adduction of the vocal folds.

70. The most sensitive site for initiation of the pharyngeal stage of swallowing is the:

A. touch receptors of the tongue.
B. taste buds.
C. hard palate.
D. tonsillar pillars.
E. uvula.

71. Chewing has most effect in enhancing the degree of degradation of:

A. white bread.
B. boiled rice.
C. cheddar cheese.
D. fried fish.
E. fried pork.

72. The cephalic phase of digestion, resulting in increased gastric motility and secretion, would be blocked by:

A. failure of mastication.
B. failure of swallowing.
C. ligation of the esophagus.
D. cutting both vagi.
E. resection of the pylorus.

73. Hormonal suppression of gastric motor and secretory activity is brought about by:

A. Enterogastrone.
B. Secretin.
C. Gastrin.
D. Cholecystokinin.
E. Pepsin.

74. Shortly after taking an ordinary mixed meal such as dinner, movements occur in the large intestine. These result from the:

A. gastro-ileal reflex.
B. myenteric reflex.
C. gastro-colic reflex.
D. anogastric reflex.
E. enterogastric reflex.

75. Ingestion of a strongly hypertonic meal in a gastrectomized subject may lead to fainting as a result of large water movement into the gastrointestinal tract. In the normal individual this effect is prevented by:

A. release of gastrin.
B. release of enterogastrone
C. the gastro-colic reflex.
D. the gastro-ileal reflex.
E. the enterogastric reflex.

76. The action of pepsin is terminated in the duodenum due to:

A. the alkalinity of the pancreatic juice.
B. degradation of the enzyme by pancreatic juice.
C. reabsorption of pepsin.
D. complexing with long chain fatty acids.
E. release of gastrin.

77. Salivary secretion in man may be elicited by:

A. release of gastrin.
B. release of secretin.
C. the sight of food.
D. release of enterogastrone.
E. release of corticosteroid.

78. The compositon of saliva is largely independent of:

A. the activities of gastro-intestinal hormones.
B. duration of stimulation of secretion.
C. rate of flow of saliva.
D. the gland from which it is secreted.
E. the type of autonomic nerve fibres that stimulate the secretion.

79. In saliva produced by the parotid gland the concentrations of hydrogen ion, amylase and protein are all dependent on the:

A. rate of flow of the secretion.
B. nature of the stimulus.
C. duration of the stimulus.
D. concentration of bicarbonate ion in saliva.
E. innervation by the facial nerve.

80. The unconditioned secretion of saliva may be due to all the following stimuli except the:

A. taste of food.
B. smell of food.
C. touch of food.
D. sight of food.
E. chemical irritation of the oesophagus or stomach.

81. In the normal adult, salivary fluid secreted by the parotid gland:

A. is higher in volume than all the other salivary fluids combined.
B. plays a major role in buffering of the oral fluids.
C. plays a minor role in the degradation of starches.
D. the bicarbonate content of the secretion is relatively unimportant in buffering.
E. has the effect of increasing dental decay, by reducing the pH of the oral fluid.

82. Acetylsalicylic acid (a weak acid which has a pk of 3.5) would be best absorbed from the stomach at a pH of:

A. 1.5
B. 3.5
C. 5.5
D. 7.0
E. 8.5

83. Epsom Salts ($MgSO_4$) would facilitate the recovery of a swallowed inlay by increasing the water content of the stool. This increase in water content of the stool is due to:

A. increased thirst and drinking.
B. increased salivary secretion.
C. increased secretion of antidiuretic hormone.
D. poor absorption of $MgSO_4$, with increase in osmotic pressure of the intestinal contents.
E. inhibition of active transport of water.

84. In muscle that is voluntarily activated, the increase in tension will result from:

A. increase in excitation threshold of muscle fibres.
B. increase in firing frequency of motor units.
C. decrease in refractory period of muscle fibres.
D. decrease in innervation ratio.
E. increase in amplitude of the action potentials in nerve fibres.

85. Increase in muscle tension resulting from an increase in the number of participating motor units is called:

A. quantal summation.
B. wave summation.
C. tetanus.
D. contracture.
E. occlusion.

86. A child ingests an unknown drug that causes lacrimation, salivation, and miosis. You would suspect the drug is acting primarily on:

A. alpha receptors.
B. beta receptors.
C. muscarinic receptors.
D. nicotinic receptors.
E. interoceptors.

87. A patient was given Pro-Banthine, which blocks transmission at nerve endings. Which of the following symptoms would he be expected to show?

A. Profuse sweating.
B. Vasodilation in skin.
C. Increase in salivation.
D. Increase in gastric secretion.
E. Increase in heart rate.

88. Most organs are reciprocally innervated by fibres of the autonomic nervous system. An exception is:

A. bronchiolar smooth muscle.
B. sweat glands.
C. gastric smooth muscle.
D. iris of the eye.
E. heart.

89. It can be expected that secretion by the adrenal medulla would be increased to the greatest extent in response to:

A. rise in glucose concentration in blood.
B. enhanced rate of release of corticotrophin-releasing factor.
C. stimulation of postganglionic, parasympathetic, nerve fibres that end around secretory cells of the organ.
D. stimulation of preganglionic, sympathetic nerve fibres that end around secretory cells of the organ.
E. stimulation of postganglionic, sympathetic nerve fibres that end around secretory cells of the organ.

90. The annulospiral endings (afferent. primary endings) of muscle spindles are stimulated:

A. when the muscle (extrafusal fibers) is stretched.
B. when the gamma efferent fibers are inhibited.
C. by the relaxation of intrafusal fibers of the spindle.
D. when the muscle relaxes.
E. None of the above are correct.

91. An afferent discharge interpreted as pain would require minimally conduction by:

A. I afferents.
B. II afferents.
C. A-beta fibres.
D. A-gamma fibers.
E. C fibres.

92. According to the "gate control" system postulated by Melzack and Wall, pain would be suppresed most effectively by:

A. increased activity in central transmission cells.
B. decreased activity in substantia gelatinosa cells,
C. increased large fibre activity.
D. decreased large fibre activity.
E. increased small fibre activity.

93. Taste buds are least likely to be found on the:

A. hard palate.
B. epiglottis.
C. pharynx.
D. fungiform papillae of the tongue.
E. vallate papillae of the tongue.

94. The knee jerk reflex is best represented by the following sequence of excitation:

A. Muscle spindle-afferent neuron-gamma efferent-muscle fibres.
B. Golgi tendon organ-afferent neuron-facilitory interneuron-alpha efferent-muscle fibres.
C. Muscle spindle-afferent neuron-alpha efferent-muscle fibres.
D. Muscle spindle-afferent neuron-inhibitory interneuron-motor neuron with recurrent collateral-muscle fibres.
E. None of above.

95. The basic reflex of posture is the:

    A. myotatic reflex.
    B. inverse stretch reflex.
    C. withdrawal reflex.
    D. crossed extensor reflex.
    E. Golgi tendon reflex.

96. The renal glomerular filtration rate may be increased by:

    A. constriction of afferent arterioles.
    B. dilatation of efferent arterioles.
    C. increase in plasma protein concentration.
    D. increase in intratubular hydrostatic pressure in the proximal tubules.
    E. decrease in plasma colloid osmotic pressure.

97. A subject drinks rapidly 1 litre of water. The ingested fluid:

    A. causes an increase in plasma volume only.
    B. is distributed in the extracellular fluid spaces.
    C. increases both the intra- and extracellular fluid spaces.
    D. results in withdrawal of fluid from cells.
    E. Both B and D are correct.

98. A subject ingests, within a few minutes, 10 grams of sodium chloride dissolved in a small (negligible) volume of water. As a result, within about 1 hour:

    A. plasma osmotic pressure is increased.
    B. extracellular fluid volume is increased.
    C. intracellular fluid volume is decreased.
    D. Only A and B are correct.
    E. All of A, B and C are correct.

99. When the volume of the extracellular fluid is increased isotonically (as by drinking a substantial volume of isotonic sodium chloride solution) which of the following would be expected to occur?

    A. Increased rate of release of aldosterone from the adrenal gland.
    B. Reduced reabsorption of sodium in the distal tubules,
    C. Reduced rate of glomerular filtration (GFR).
    D. Both A and B are correct.
    E. Both B and C are correct.

100. Given that: the value of pK for the dissociation of carbonic acid (H_2CO_3) = 6.1

the concentration of bicarbonate ion (HCO_3-) in plasma = 20 mEq/l

the concentration of carbonic acid in plasma = 2 mEq/l.

The calculated pH of the plasma is therefore:

A. 6.2
B. 6.5
C. 6.8
D. 7.1
E. 7.4

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THIRD YEAR DENTISTRY

ANAESTHESIA

MARKS

25 1. Discuss the A B C's of resuscitation as they would be applied to the unconscious patient in an emergency.

25 2. What emergency armamentarium should be available in the dental office? Discuss the application of the armamentarium you list.

25 3. An upper cuspid has acute periapical involvement with considerable swelling. Discuss anaesthesia for this tooth to permit drainage prior to endodontia.

Please answer Question # 4 in a separate book.

25 4. Discuss syncope as it may be encountered in the dental treatment situation under the following headings:

a) recognition
b) control
c) prevention

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THIRD YEAR DENTISTRY

GENERAL SURGERY

MARKS

12 1. A patient has a severe streptoccal cellulitis of the face.

(a) Describe the local and systemic features.
(b) Describe the treatment.

12 2. A patient has had a massive haemorrhage from a duodenal ulcer.

(a) Describe the clinical features.
(b) Indicate the immediate urgent treatment.

12 3. A patient has an ulcer in the skin just anterior to the ear.

(a) Describe the clinical features that might indicate that it was malignant.
(b) Describe the management of such a lesion if malignant.

12 4. (a) Describe the clinical features of a fracture of a long bone.

(b) Enumerate the complications that may occur.

12 5. Describe the clinical features and etiology of two congenital lesions that may occur in the median plane of the neck anteriorly.

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NUTRITION

MARKS

3 1. (a) If the high cost of citrus fruits and juices prohibits their use daily for a large family on a low income, what other foods would you recommend to supply the required amount of Vitamin C?

4 (b) "Give your family vitamins to be safe. Vitamins are insurance". Do you agree? Comment and give reasons for your answer.

10 2. What nutrient or nutrients would you expect to be low in a diet which contained little or none of the following?

(a) milk and cheese.
(b) citrus fruits or juices.
(c) meat.
(d) yellow or green, leafy vegetables or tomatoes.
(e) whole grain cereals or enriched bread.

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FOURTH YEAR

MARKS

DENTAL PUBLIC HEALTH

4 1. a) List four dental health procedures which could be best implemented on a group or community basis rather than on an individual or private office basis.

6 b) Elaborate on one of these to show that the group approach clearly is superior.

25 2. Describe briefly any five of the following:

a) Eligibility limitations as a disadvantage in voluntary dental prepayment plans.

b) The term percentage possible as related to numbers of people exposed to water fluoridation.

c) The term incremental plan as related to children's dental health plans.

d) The key points used to describe what is meant by dental public health.

e) Realistic steps which could be taken to alleviate the problem of maldistribution of dental manpower.

f) Roles of provincial governments in current public dental care programs.

g) Methods used in voluntary dental prepayment plans to keep premium costs down.

h) Two alternative methods to water fluoridation in caries prevention and list the possible disadvantages.

MARKS

ETHICS, JURISPRUDENCE AND PRACTICE ADMINISTRATION

7 1. Discuss the ethical methods by which a dentist about to enter practice may make himself known to the public.

7 2. A tooth is lost during extraction and it seems to have been swallowed by the patient. Outline your course of action following this discovery.

8 3. Enumerate the essentials to be covered in a case presentation.

8 4. How would you calculate a fixed hourly overhead of a dental office?

ENDODONTICS

10 1. State (10) ten indications for root resection and/or periapical curettage.

5 2. Describe a method, which you prefer, for sterilizing root canal instruments and materials and give reasons for your preference.

10 3. a) An 8 year old child presents for emergency dental treatment one hour after an accident in which the crown of a maxillary central incisor is fractured, so as to show a wide exposure of the pulp. What is the best treatment at this time? Describe procedures.

10 b) A 15 year old presents with a non-vital upper central incisor. Radiographic examination shows a wide open canal and a wide open apex (incomplete calcification). What is the likely causative factor? Describe two possible treatment methods.

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FOURTH YEAR

ORAL DIAGNOSIS

MARKS

15 1. A girl of 14 presents with a slow growing, diffuse, painless swelling of the right maxilla.

(a) List the investigations you would undertake to establish a diagnosis.

(b) List the possible causes in order of probability.

(c) List the findings of the investigations in a classical case of the condition you have selected in (b) as the most probable.

20 2. (a) List the classical steps in taking a history.

(b) List the salient features in the history given by a patient which would lead to a diagnosis of Trigeminal Neuralgia.

15 3. Write brief notes on the dental and oral aspects of:

(a) Hyperparathyroidism

(b) Lichen planus

(c) Acute leukaemia

(d) Melanotic pigmentation

(e) Thrombocytopoenic purpura

MEDICINE

MARKS — ANSWER THE FOLLOWING TWO QUESTIONS (10 marks each)

10 — 1. Describe briefly the metabolic changes which occur when insulin is absent from the system (i.e. in a young person with severe diabetes mellitus).

10 — 2. (a) List the "cardinal signs" of acute rheumatic fever.
(b) What may be the long-term effect of rheumatic fever on
- i. joints?
- ii. brain?
- iii. endocardium?

ANSWER ANY THREE OF THE FOLLOWING QUESTIONS (10 marks each)

3. Write a short note on angina pectoris, including
   - i. description
   - ii. cause
   - iii. prognosis

4. Write a brief note on hepatic cirrhosis associated with alcoholism.

5. What are the major symptoms (what the patient complains of) and signs (what you see) in an individual with congestive heart failure?

6. (a) List four major functions of the liver, and give an example of each.

   (b) What major change occurs in pigment (bilirubin) metabolism in liver cell failure, and how is this reflected clinically?

7. Write a brief note on the following:
   - i. prothrombin time
   - ii. Coomb's test
   - iii. Schilling test for pernicious anaemia

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FOURTH YEAR

ORAL SURGERY

MARKS

10 1. A healthy forty year old male presents with the retained apical third of the roots of the left maxillary first bicuspid, second bicuspid and second molar teeth. Describe and illustrate with diagrams the surgical removal of these roots.

10 2. Which areas of the face are the most likely sources of infection leading to cavernous sinus thrombophlebitis? Outline two possible routes for this event.

10 3. Describe briefly the surgical procedures which may be employed in the treatment of intractable temporomandibular joint pain.

10 4. Write brief notes on the following:

- a) dental surgery for patients with history of rheumatic fever
- b) apertognathia
- c) timing of tooth removal in acute odontogenic infection

Please answer Question #5 in a separate book.

10 5. Shortly after the administration of a local anaesthetic a patient experiences difficulty in breathing. This progresses to the extent that the patient becomes pallid. Discuss this emergency under the following headings:

- a) Diagnosis
- b) Treatment
- c) Prevention

UNIVERSITY OF TORONTO
FACULTY OF DENTISTRY

Annual Examinations, 1971

FOURTH YEAR

RESTORATIVE DENTISTRY

MARKS Please answer Question #1 in a separate book.

45 1. A 44 year old man presents to your office following an automobile accident which has resulted in the loss of 1/3 the coronal length of 2/ and 1/.

Clinical examination reveals that there are no pulp exposures. 1/ has M2 mobility and is tender to percussion. 6/ and 5/ have been extracted for many years. /4 was extracted three weeks previously by a dentist in another city. All mandibular molars were extracted several years ago and a replacement has never been worn. 57 is extruded above the mandibular occlusal plane.

The oral hygiene is fair. There is moderate subgingival calculus in most areas of the mouth and there is medium supragingival calculus at the lingual surface of the lower incisors. There is an obvious simple gingivitis at the labial surface of the lower incisors and early simple gingivitis about the rest of the teeth. Existing restorations, periodontal pockets, abnormal mobilities and approximal contacts are shown on the chart. The pocket at the distal of /3 has one bony wall and that at the distal of /4 has three bony walls.

Radiographic examination reveals:

A diagonal root fracture of 1/ from C.E. junction to the apical 1/3 of the tooth.

No new dental caries.

No periapical pathology.

Previous restorative dentistry is satisfactory.

Bone loss pattern in areas of pockets consistent with the direct clinical evidence.

The patient desires to have complete restorative and periodontal treatment.

a) Carefully outline your total treatment plan, stating sequence of treatment.

b) Specify principles of pocket therapy which would be applied in reducing the depths of the pockets in the various areas of the mouth.

c) Describe the objectives and procedures for treating the pockets about /3 4.

d) Discuss the long term effects of a Kennedy Class I removable lower partial denture on the oral tissues and relate these changes to the principles of design and impression making.

e) Discuss alternative treatment procedures that may be used to restore the maxillary arch. State your preferred treatment, giving reasons.

Please answer Questions #2 and #3 in a separate book.

15 2. Under what conditions would the following materials be used to restore anterior teeth? Indicate the limiting or contra-indicating factors in each case.

a) Amalgam
b) Silicate cement
c) Composite resin
d) Acrylic resin
e) Ceramic porcelain
f) Gold foil
g) Gold inlay
h) 3/4 veneer gold crown
i) Porcelain fused to full gold crown
j) Fortified zinc oxide eugenol cement

3. Write notes on:

4 a) Balancing contacts
3 b) Venting restorations prior to cementation
3 c) Treatment of "dentine blushing" during crown preparation

Please answer Questions #4 and #5 in a separate book.

10 4. List and discuss factors which determine the prognosis of the periodontal tissues about teeth.

5 5. Illustrate, by drawings, factors which influence the mobility of teeth.

Please answer Question #6 in a separate book.

15 6. A 65 year old male requests complete denture treatment with a complaint of diminished masticatory ability. He has been wearing the same dentures for 20 years. They are ill-fitting and unclean. The denture bearing areas are hyperaemic and soggy. There is no ulceration present. An apparent over-closure is present, accompanied by mild, occasionally tender angular cheilitis.

a) Outline the relevant factors which have contributed directly or indirectly to the patient's oral status.

b) Discuss your proposed treatment plan.

University of Toronto
Faculty of Food Sciences

FINAL EXAMINATION 1971

F.S. 100 - Biological Chemistry and Human Nutrition

Mrs. Sharyn Joliat
April 23, 1971.

All questions are of equal value.

FIVE questions constitute of complete paper.
Choose any FIVE questions and indicate which ones you answered on the outside of your examination books.

1. Explain FOUR of the following terms and write a brief note on their biological significance. Use specific illustrations in your answer.

   a) isotope
   b) hexose monophosphate shunt
   c) deamination
   d) active transport
   e) essential amino acids
   f) bile salts

2. "Metabolic charts reveal that various foodstuffs and endogenons substances are broken down constantly to produce common intermediates or a common pool of metabolites. Once submerged in the pool, the origin of the molecule can no longer be stated with certainty"

   Discuss this statement with regard to protein, fat and carbohydrate metabolism.

3. Many nutrients are closely interrelated with each other, either functioning as part of the makeup of the same tissue, or together in body metabolism. Explain fully the interrelationships existing within any TWO of the following groups:

   a) B vitamins and fatty acid synthesis.
   b) Calcium, phosphorus and vitamin D.
   c) Folic acid, cobalamine and ascorbic acid.

4. In deficiency diseases associated with the lack of minerals and vitamins, the oral mucosa and teeth may be affected. For FOUR of the following nutrients discuss the clinical manifestations that may be seen by a dental hygienist, and the food sources of these nutrients that could help alleviate the disease.

   a) Magnesium
   b) Ascorbic Acid
   c) Phosphorus
   d) Vitamin A
   e) Riboflavin
   f) Iron

5. "Hydrogen bonding is extremely important in the structure and function of several essential biological compounds."

   Discuss this statement fully using specific examples to illustrate your answer.

6. As a dental hygienist, you may have the opportunity to discuss food habits with patients. It will be essential that you answer questions accurately and with some knowledge. Discuss the answers you would give to the following comments and questions by a patient:

   a) "I have been told that it is difficult to obtain sufficient B complex vitamins in my diet so I have been going to a Health Food Store and buying wheat germ to supplement my intake. Do you think that this is necessary?"

   b) "I have been taking gelatin every day for two months to help strengthen my finger nails. Will this help strengthen the enemel of my teeth as well?"

   c) "I have heard that cholesterol is very bad for you so I have been omitting all eggs, butter, and baked goods that might contain cholesterol".

7. "It is only through the activity of enzymes that most biochemical reactions can proceed in living forms."

   Discuss this statement fully, including the function of enzymes, the action with substrates and the factors which affect the velocity of the reactions in which enzymes are involved.

UNIVERSITY OF TORONTO

Faculty of Dentistry

ANNUAL EXAMINATION 1971

English 513 - First Year Dental Hygiene

E. Meade
N. L. Kay

Time: 3 hours

Answer ONE question from EACH section AND A FOURTH question from any of the three sections. Do not write at length on any one author more than once.

A

1. Discuss the titles of any two of the plays you have studied as they illuminate and are illuminated by the unfolding dramatic action.

2. Discuss the way past events are revealed in any two of the plays and how the method and timing of the revelations affect the audience's apprehension of the action.

3. Discuss the closing scenes of any two of the plays. To what extent do they impel us towards a deeper and perhaps modified evaluation of the preceding action?

4. Discuss the theme of illusion and reality in any TWO of: The Plough and the Stars, A Streetcar Named Desire, Ghosts.

5. Name and discuss some ways in which Isabel Archer and Blanche Dubois are similar character types.

B

5. Discuss the concept of the outsider, comparing any TWO of the following characters: Gilbert Osmond, Joe Christmas, Alec D'Urberville.

6. Discuss the ways in which villains are presented in TWO of the novels you have read. Does the concept apply to more than one character?

7. Compare and discuss the main character's search for identity in TWO of the following: The Portrait of a Lady, Light in August, "Daughters of the Vicar".

8. Discuss the relative importance of specific time and place settings in any two of the novels studied.

9. Discuss the treatment of inner experience in any two of the novels you have studied.

10. "The simple country girls, Lena Grove and Tess Durbeyfield, are presented as heroines whose dignity is as impressive as that of Isabel Archer in The Portrait of a Lady." Discuss.

11. In *The Egoist*, *The Portrait of a Lady* and *Light In August* various characters find themselves in the position of more or less privileged spectators to crises in the lives of others. Discuss the moral dilemma involved for the main spectators in TWO of these novels.

C

12. "The voice we hear in the poetry of Dylan Thomas is that of a man who never grew up; in T. S. Eliot's poetry, it is that of a man who was never young". Discuss referring to at least *two* poems by each. You may agree or disagree, with or without qualifications.

13. "The 'rebirth of wonder' for which Ferlenghetti waits is as much a protest against the secularization of modern life as T.S. Eliot's more orthodox religious poetry." Discuss referring to at least *two* poems by each; agree or disagree, with or without qualifications.

14. Discuss the meaning conveyed by the imagery in THREE poems by TWO of the following: Whitman, Hardy, Yeats, Auden, Thomas, Eliot, Cohen, Ferlenghetti.

15. Discuss the poetry of any two of the poets you have studied under one of the following headings: (refer to at least *two* poems by each of the poets you choose)
    a) The loss of innocence;
    b) Love and the puritan conscience;
    c) The impotence of modern man;
    d) Death.

16. Compare the following poem by Dylan Thomas with the way Ferlenghetti and Whitman view their roles as poets, referring to at least *one* poem by each of them and to the titles they chose for their collections.

OR Give a detailed analysis of the following poem:

In my Craft or Sullen Art

In my craft or sullen art
Exercised in the still night
When only the moon rages
And lovers lie abed
With all their griefs in their arms,
I labour by the singing light
Not for ambition or bread
Or the strut and trade of charms
On the ivory stages
But for the common wages
Of their most secret heart.

Not for the proud man apart
From the raging moon I write
On these spindthrift pages
Nor for the towering dead
With their nightingales and psalms
But for the lovers, their arms
Round the griefs of the ages,
Who pay no praise or wages
Nor heed my craft or art.

UNIVERSITY OF TORONTO
FACULTY OF DENTISTRY

Annual Examinations, 1971

FIRST YEAR DENTAL HYGIENE

HISTOLOGY

MARKS

5 1. a) List the components of the periodontium.

60 b) By means of fully labelled drawings and diagrams illustrate the microscopic anatomy of the periodontium.

10 c) List the functions of the periodontal ligament.

25 2. Write short notes on the following. Illustrate your answers with fully labelled drawings.

a) odontoblast

b) parotid striated duct cell

c) Hertwig's epithelial root sheath

d) a protein synthesizing and retaining cell (name example)

e) a cell specialized to produce protein for export (name example)

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FIRST YEAR DENTAL HYGIENE

ORAL ANATOMY

MARKS

10 1. By means of labelled diagrams, describe and differentiate:

$\underline{6/}$, $\underline{7/}$, $\underline{8/}$.

15 2. Draw the occlusal view of the dentition in the mandibular right quadrant of a child 8 years of age. Identify the teeth by means of the Universal System.

20 3. Classify -

a) The primary dentition
b) The permanent dentition
c) The craniofacial skeleton
d) Variations and anomalies

5 4. Define PHYSIOLOGICAL REST POSITION, give synonyms and indicate its relationship to FREEWAY SPACE.

GROSS ANATOMY

14 1. (a) List the parts of the digestive system.

(b) Describe the size, location and function of each part.

20 2. (a) Describe the muscles of mastication.

(b) Describe the blood supply and nerve supply to the mandibular bicuspids and the surrounding gingiva.

16 3. Discuss briefly only four (4) of the following:

(a) Prostate gland
(b) Thyroid gland
(c) Sub-mandibular gland
(e) Diaphragm
(f) T M joint

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SECOND YEAR DENTAL HYGIENE

DENTAL PUBLIC HEALTH

MARKS

8 1. a) If a patient asked you "What do you mean by dental Public health?", briefly give your answer.

5 b) List five possible dental health programs that could be best implemented on a group or a community basis rather than on an individual or private office.

12 c) Elaborate on one of these programs to show the advantages of the group or community approach.

CLINICAL NUTRITION

7 1. a) What is a whole grain cereal? Give an example.
b) What is an enriched cereal? Give an example.
c) How would you counsel a mother whose four year old likes and eats Sugar Crisps for breakfast. Give reasons for your advice.

8 2. a) Many women and children have low intakes of iron. What foods should be included in the diet to increase the intake of iron?

b) What advice would you give a mother, living in Toronto, regarding Vitamin D for her thirteen year old boy?

c) Briefly discuss Nutrition in pregnancy considering weight gain, caloric intake and increased needs for certain nutrients.

10 3. Write and discuss dietary recommendations for the following:

a) A 14 year old girl - 15 lbs. overweight - with rampant caries. Food intake record showed an adequate intake of meat, eggs, cheese, potatoes and bread and an extremely high intake of cariogenic foods. Patient does not eat breakfast.

b) An adult male - average weight - caries inactive, required periodontal treatment. Food intake record showed low intake of calcium, Vitamin C and Vitamin A and very few cariogenic foods.

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SECOND YEAR DENTAL HYGIENE

MARKS

PATHOLOGY

15 1. Describe granulation tissue in the process of the healing of a wound.

OR

Describe the factors that influence the process of a wound healing.

15 2. Describe acute pulpitis.

20 3. Write a short description of:

- a) Ranula
- b) Fordyce granules
- c) Osteomyelitis of jaw bones
- d) Eruption cyst

PERIODONTICS

5 1. a) List the main manifestations of periodontal disease.

5 b) List additional important considerations to the making of a diagnosis and treatment plan concerning periodontal disease.

7 2. a) Outline a classification of gingivitis.

7 b) Outline causes of gingivitis.

5 c) What are the reasons for particular significance of necrotizing ulcerative gingivitis?

3 3. a) State the two main types of periodontal pockets.

5 b) What is the relative frequency of the two types?

7 c) What difference does the relative frequency of types of pockets make to the treatment of periodontal disease?

6 4. Describe briefly factors which determine the mobility of teeth.

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SECOND YEAR DENTAL HYGIENE

MARKS

PHARMACOLOGY

(each question 6 marks)

6 1. Give one example each of the following types of sedatives:

a) For pre-medication

b) Long-duration

c) Intravenous anaesthesia

6 2. a) Name two analgesics that are alkaloids of opium.

b) Name one synthetic analgesic that may be used as an alternative to acetylsalisylic acid.

6 3. Two of the following antibiotics closely resemble one another in their spectrum of antibacterial activity: (1) tetracycline (2) penicillin (3) polymyxin B sulfate (4) erythromycin.

Which two?

6 4. Give one possible use in dentistry for each of the following:

a) Corticosteroids

b) Anti-histamines

c) Absorbable gelatin sponge

6 5. Give one example for each of a drug used for the following purposes:

a) To reduce secretions of glands

b) Added to local anaesthetic solutions for vasoconstriction

c) To reduce the sensitivity of exposed root surfaces.

ORTHODONTICS

1. The patient's diet is of great concern in relation to orthodontic treatment.

10 a) Indicate the areas of diet which you would investigate.
10 b) What dietary instructions would you give a patient about to be fitted with Fixed Multibanded Appliances?

10 2. Briefly discuss the aetiology of malocclusion.

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